

What is claimed is:

1. An etching method for plasma-etching a low-k film, wherein the plasma etching is conducted under an etching gas atmosphere including a fluorocarbon gas, O<sub>2</sub> gas and Ar gas, and under the conditions of a pressure of 60 mTorr (7999.32 mPa) or higher and a high-frequency output (RF power) of 600 W or less.
2. The etching method of claim 1, wherein the fluorocarbon gas includes at least one selected from the group consisting of C<sub>4</sub>F<sub>8</sub>, C<sub>5</sub>F<sub>8</sub>, C<sub>4</sub>F<sub>6</sub> and C<sub>3</sub>F<sub>6</sub>.
3. The etching method of claim 1, wherein the low-k film is one selected from the group consisting of an organic SOG film, an SiOC film and a pure organic film.
4. The etching method of claim 1, wherein a ratio of O<sub>2</sub> to a combined amount of the fluorocarbon gas and O<sub>2</sub> is 20 to 50%.
5. A semiconductor device fabricating method including an etching step of plasma-etching an interlayer insulating film comprising a low-k film, wherein the etching step is conducted under an etching gas atmosphere including a fluorocarbon gas, O<sub>2</sub> gas and Ar gas, and under the conditions of a pressure of 60 mTorr (7999.32 mPa) or higher and a high-frequency output (RF power) of 600 W or less.

6. The semiconductor device fabricating method of claim 5, wherein the fluorocarbon gas includes at least one selected from the group consisting of  $C_4F_8$ ,  $C_5F_8$ ,  $C_4F_6$  and  $C_3F_6$ .

7. The semiconductor device fabricating method of claim 5, wherein the low-k film is one selected from the group consisting of an organic SOG film, an SiOC film and a pure organic film.

8. The semiconductor device fabricating method of claim 5, wherein an etch stop layer is not formed under the interlayer insulating film comprising the low-k film.

9. The semiconductor device fabricating method of claim 5, wherein a ratio of  $O_2$  to a combined amount of the fluorocarbon gas and  $O_2$  is 20 to 50%.

10. A semiconductor device fabricating method comprising the steps of:

forming a first interconnection;

forming a low-k film as an interlayer insulating film on the first interconnection;

forming a contact hole for electrically connecting the first interconnection and a second interconnection, in the interlayer insulating film comprising the low-k film; and

forming an interconnection groove for embedding the second interconnection in the interlayer insulating film comprising the low-k film,

wherein, in at least one of the hole forming step and the interconnection groove forming step, plasma etching is conducted under a gas atmosphere including a fluorocarbon gas, O<sub>2</sub> gas and Ar gas, and under the conditions of a pressure of 60 mTorr (7999.32 mPa) or higher and a high-frequency output (RF power) of 600 W or less.

11. The semiconductor device fabricating method of claim 10, wherein the fluorocarbon gas includes at least one selected from the group consisting of C<sub>4</sub>F<sub>8</sub>, C<sub>5</sub>F<sub>8</sub>, C<sub>4</sub>F<sub>6</sub> and C<sub>3</sub>F<sub>6</sub>.

12. The semiconductor device fabricating method of claim 10, wherein the low-k film is one selected from the group consisting of an organic SOG film, an SiOC film and a pure organic film.

13. The semiconductor device fabricating method of claim 10, wherein an etch stop layer is not formed under the interlayer insulating film comprising the low-k film.

14. The semiconductor device fabricating method of claim 10, wherein a ratio of O<sub>2</sub> to a combined amount of the fluorocarbon gas and O<sub>2</sub> is 20 to 50%.

15. The semiconductor device fabricating method of claim 10,  
wherein, in both of the hole forming step and the interconnection groove  
forming step, plasma etching is conducted under a gas atmosphere  
including a fluorocarbon gas, O<sub>2</sub> gas and Ar gas, and under the conditions  
of a pressure of 60 mTorr (7999.32 mPa) or higher and a high-frequency  
output (RF power) of 600 W or less.